

a magnetic field generator configured to apply a magnetic field to a surface of the substrate to which the plasma process is applied; and

an auxiliary electrode provided on an outer periphery of said first electrode to excite plasma in a vicinity of the auxiliary electrode,

wherein electrons in the plasma drift from a front surface of said auxiliary electrode to a back surface thereof and from the back surface of said auxiliary electrode to the front surface thereof.

2. (Amended) The plasma processing apparatus as claimed in claim 1, wherein the front surface of said auxiliary electrode is covered by an insulating material.

3. (Amended) The plasma processing apparatus as claimed in claim 1 or 2, wherein the substrate has a surface positioned at a level substantially equal to a level of the front surface of said auxiliary electrode.

4. (Amended) The plasma processing apparatus as claimed in claim 1 or 2, wherein said magnetic field generator comprises a dipole ring-magnet.

5. (Amended) The plasma processing apparatus as claimed in claim 1 or 2, wherein said first electrode is supplied with a first radio frequency and said auxiliary electrode is supplied with a second radio frequency and wherein the first and the second radio frequencies are equal to each other and have different phases thereof are different from each other.

6. (Amended) The plasma processing apparatus as claimed in claim 1 or 2, wherein said first electrode is supplied with a first radio frequency and said auxiliary electrode is supplied with a second radio frequency and wherein said second radio frequency is higher than said first radio frequency.

7. (Amended) A plasma processing method performed in a plasma processing apparatus comprising a first electrode on which a substrate is positioned and an auxiliary electrode provided on an outer periphery of said first electrode, the method comprising:

subjecting the substrate to a plasma process containing a plasma;

applying a magnetic field to a surface of the substrate to which the plasma process is applied;

exciting plasma on at least a back surface of the auxiliary electrode; and causing electrons in the plasma to drift from a front surface of said auxiliary electrode to the back surface thereof and from the back surface of said auxiliary electrode to the front surface thereof.

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